Medical Research in DoD

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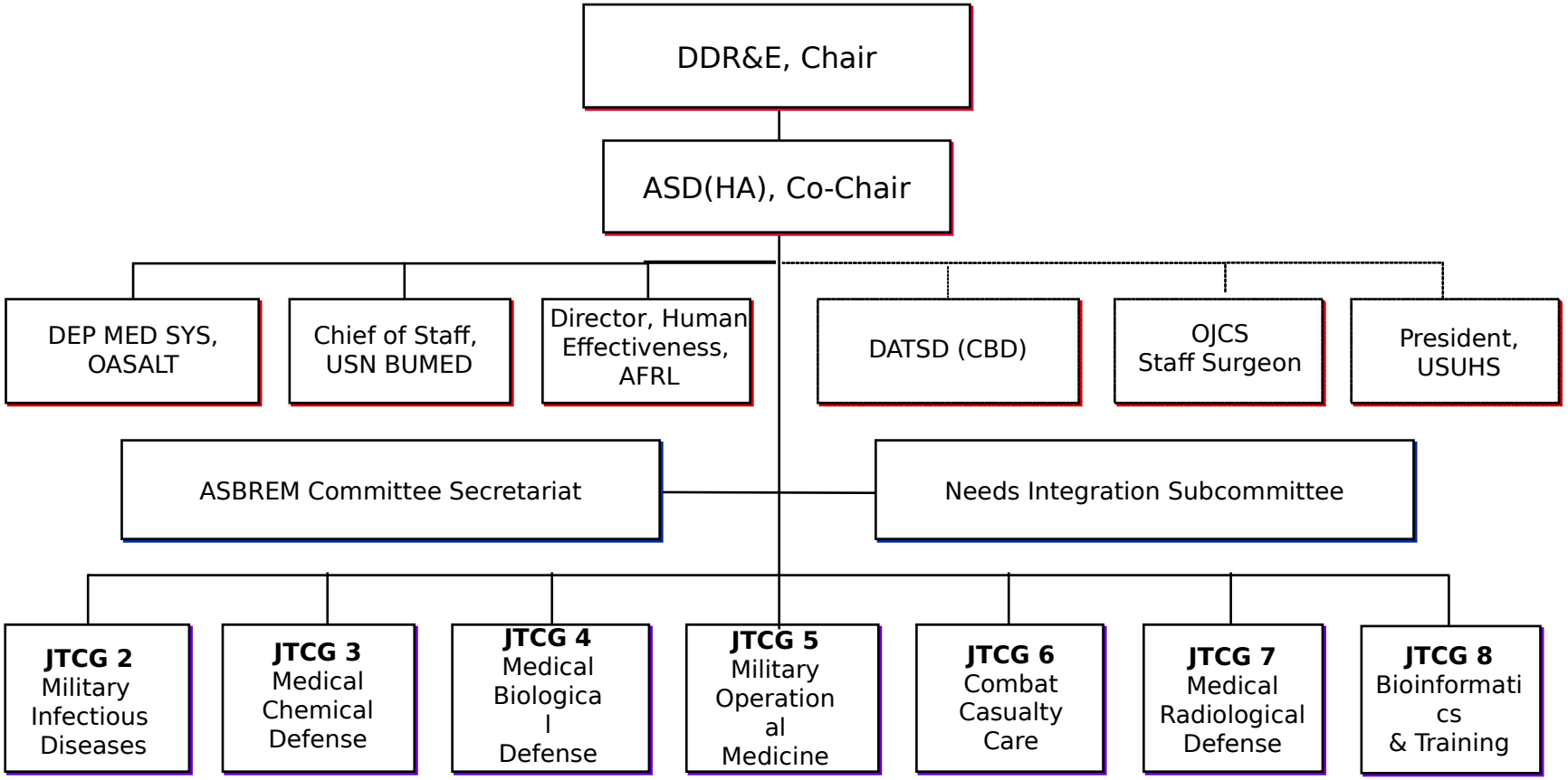
(Force Health Protection and Readiness)

Scope of Program

- **Development of knowledge base for technology to preserve the health and mission capability of military personnel.**
- **Enablers for the Military Health System, Force Health Protection initiatives, and deployment health.**
- **Subareas:**
  - **Infectious Diseases of Military Importance.**
  - **Military Operational Medicine.**
  - **Combat Casualty Care.**
  - **Medical Radiological Defense.**
  - **Medical Informatics and Training. (New thrust area)**
  - **Medical Chemical and Biological Defense.***

***Medical Chemical & Biological Defense is programmed and executed under separate authority (PL 103-160).**

ASBREM Committee



ASBREM Committee provides joint oversight and focus of DoD biome

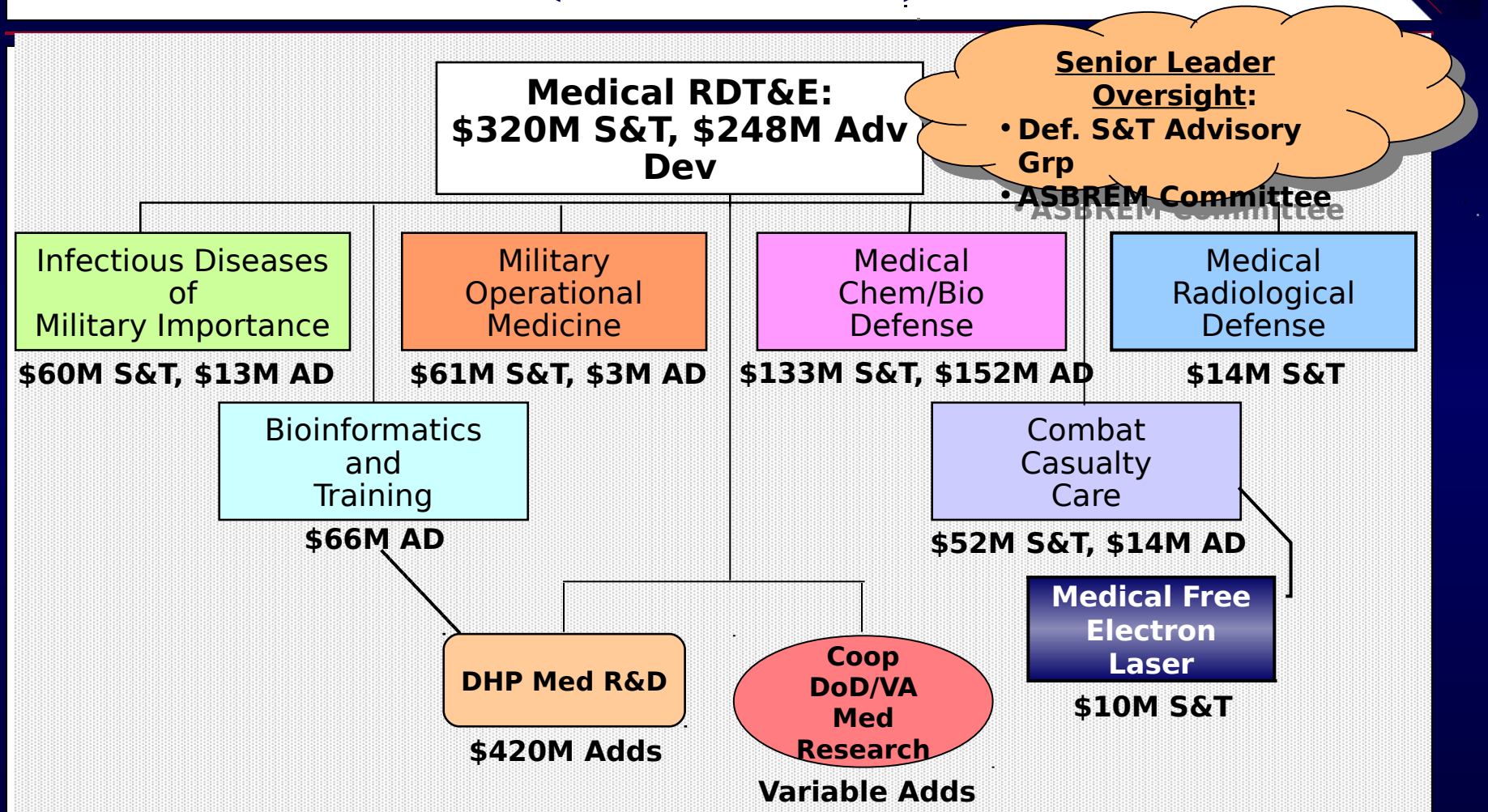
Biomedical S&T: Selected Accomplishments

- Hepatitis E vaccine moved to advanced development.
- Live, quadrivalent dengue vaccine moved to advanced development.
- Licensure of new antimalarial drug.
- Demonstration of visual performance with laser eye surgery.
- Enhancement of fighter pilot training and safety through fatigue avoidance.
- Reduction of spatial disorientation with situational awareness system.
- 10-week red cell storage solution moved to advanced development.
- Fibrin bandage moved to advanced development.
- Frozen blood processing system moved to advanced development.
- Hand-held dental x-ray system fielded by Army.
- Quantified radioprotective efficacy of 5-androstenediol in small rodent.
- Developed safety/toxicity profiles of 5-AED in large animal model.
- Identified promising new radioprotectant compound.
- Demonstrated method of blocking GI radiation injury.

Acquisition/Warfighting Needs

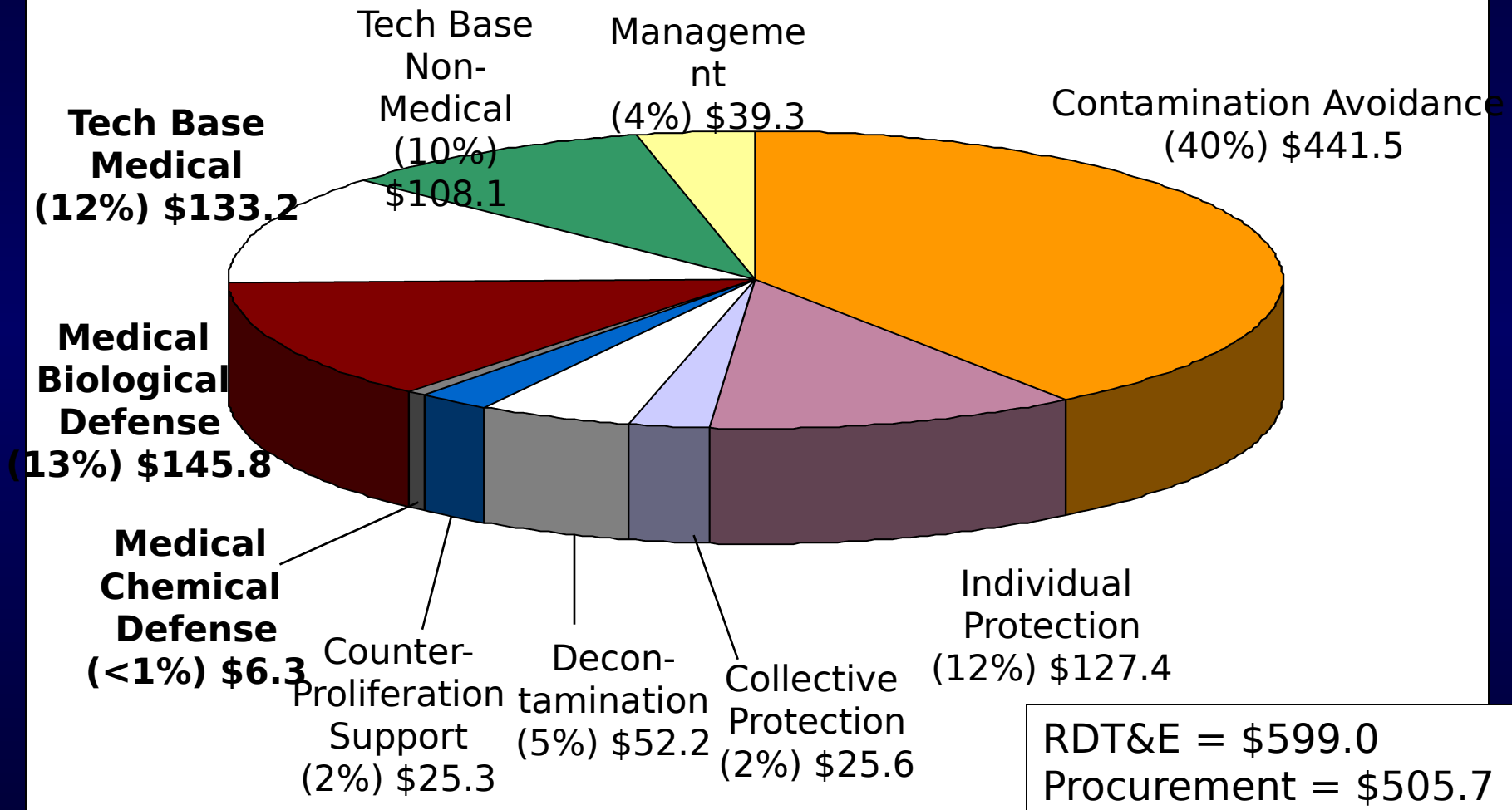
- Preparedness for regional conflict.
- Preventive medicine.
- Life-saving treatment, resuscitative care, and stabilization.
- Rapid evacuation to CONUS-based facilities.
- Improved logistics and communications.
- Enhanced personnel readiness for joint and combined operations.
- Theater Medical Health System information technology.
- Tactical-to-strategic surveillance.

Medical Research in DoD (FY04 PBR)



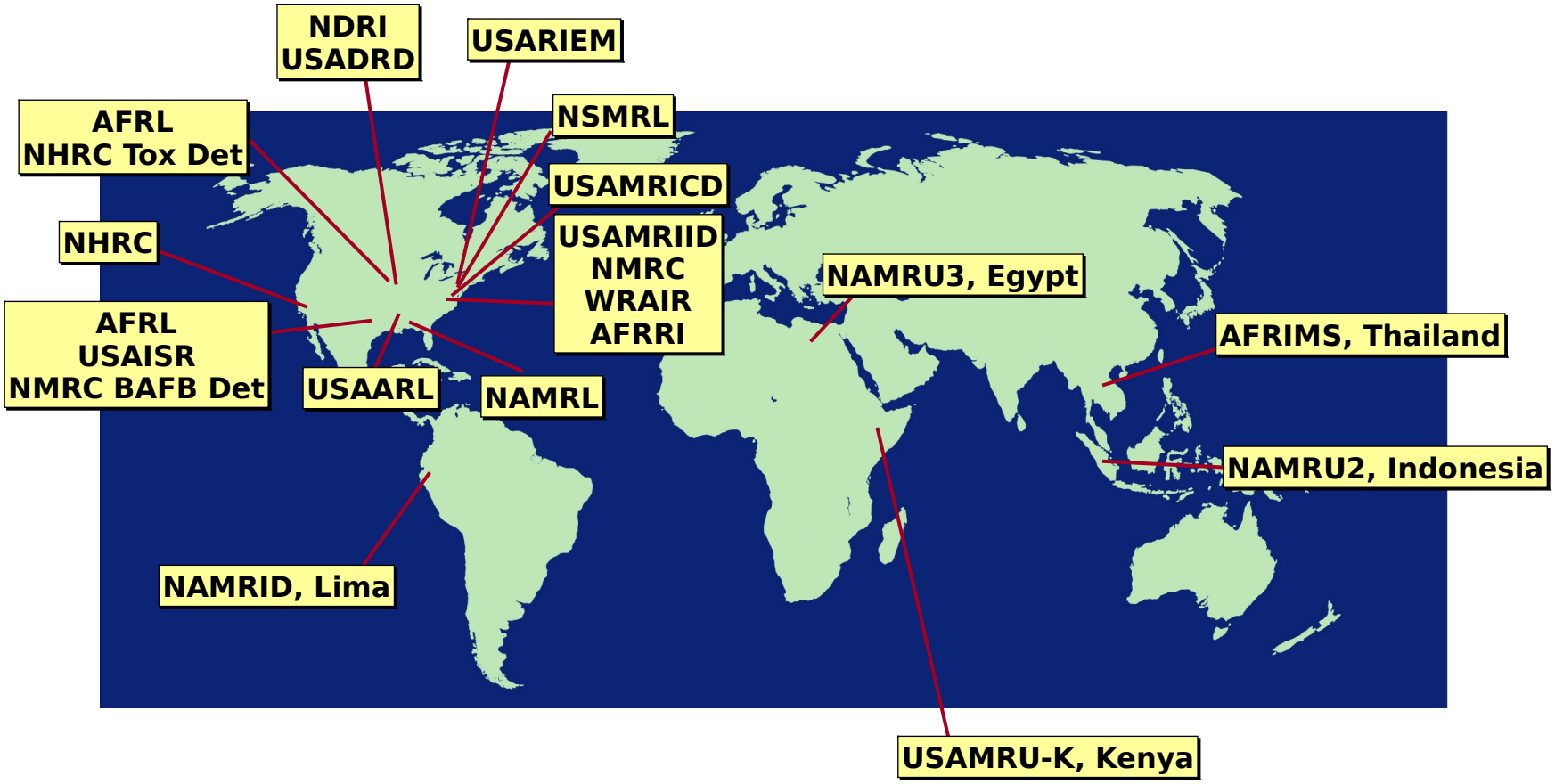
DoD Chem/Bio Defense Program (FY04 PBR)

Funding by Commodity Area ($M)


Tech Base Non-Medical (10%) $108.1
Management (4%) $39.3
Contamination Avoidance (40%) $441.5
Tech Base Medical (12%) $133.2
Medical Biological Defense (13%) $145.8
Medical Chemical Defense (<1%) $6.3
Counter-Proliferation Support (2%) $25.3
Decon-tamination (5%) $52.2
Collective Protection (2%) $25.6
Individual Protection (12%) $127.4

RDT&E = $599.0
Procurement = $505.7
Total = $1,104.7 million

Medical Laboratories—Intramural Program



Infectious Diseases of Military Importance

- **Investment: $60M S&T, $13M Adv Dev ('04 PBR).**
- **Infectious disease can influence the outcome of military operations through:**
  - **Morbidity**
  - **Mortality**
  - **Morale disturbance**
  - **Use of resources**
- **30+ potential infectious disease threats to US forces have been identified.**
- **Primarily addresses diseases that have impacted military operations**

Combat Casualty Care

- **Investment: $52M S&T, $14M Adv Dev ('04 PBR)**
- **Since mid-WWII, 50% of combat deaths have been due to hemorrhage.**
  - **Half could have been saved through timely, appropriate care.**
  - **Ability to rapidly locate, diagnose, treat & monitor during transport is vital.**
- **Providing c… key**

Fibrin Bandages

Smart Tourniquet

Resuscitative Fluids

Freeze-dried Platelets

Pneumothorax Detector

Medical Radiological Defense

- **Investment: $14M S&T (‘04 PBR)**
- **Need to prevent ionizing radiation injuries in nuclear/radioactive operational environments.**
- **Need for prophylactic and treatment protocols.**
- **Need for knowledge of combined NBC risks.**
- **Need for casualty prediction models.**
- **Need for biological dosimetry to guide triage and treatment.**
- **Use of depleted uranium munitions requires assessment of toxicity and development of treatment strategies.**

Radiation Protectants

Deployable Biodosimetry

Cytogenic Assays

Medical Chemical/Biological Defense

- **Investment: $133M S&T, $152M AD ('04 PBR)**
- **Provide medical solutions for military requirements to protect and sustain the force in a chemical and/or biological warfare environment**
- **Preserve total warfighter effectiveness on a CW/BW battlefield:**
  - Prevent casualties
  - Provide effective treatment of casualties for rapid return to duty
  - Provide rapid, far-forward diagnosis of CW/BW disease.

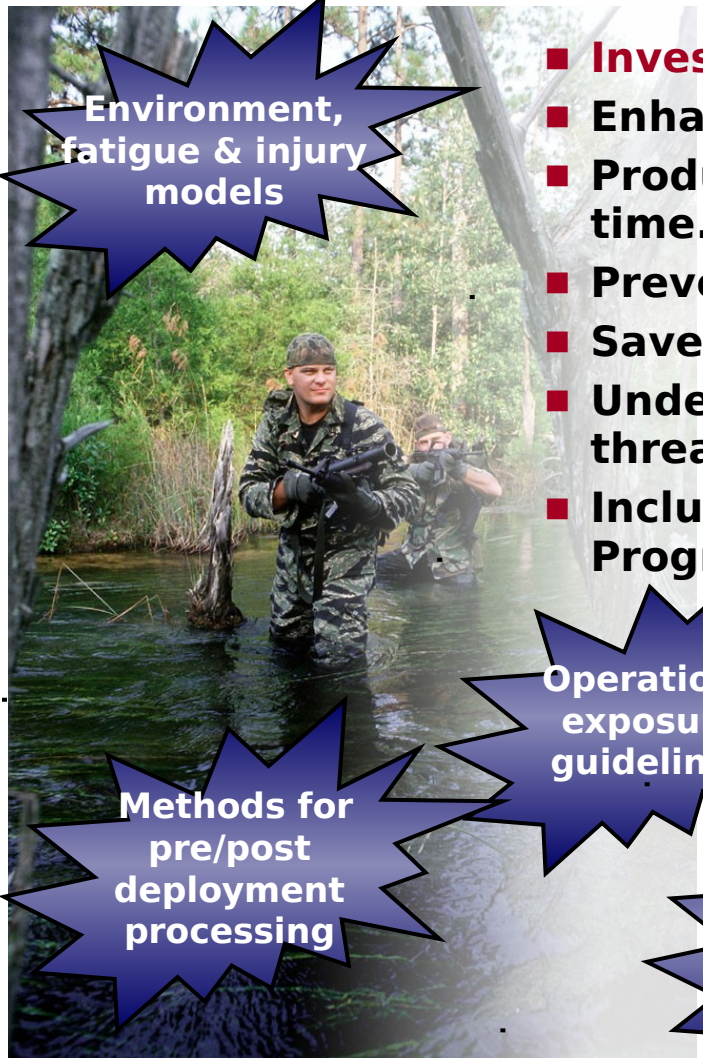
Vaccines/ pretreatments

Diagnostic tests and reagents

Bioinformatics and Training

- **Investment: $66M AD (’04 PBR)**
- **Leverages MOM & CCC efforts.**
- **Surveillance systems to collect and monitor data for disease trends and/or outbreaks.**
- **Point-of-care PDA for medical reporting and treatment/diagnostic assistance.**
- **Joint patient DNBI accounting.**
- **Integration of environmental biosensors, medical surveillance, & communications systems.**
- **Define, refine & transition technologies & CONOPS that significantly increase responsiveness in consequence management, crisis response, deterrence & intelligence coordination.**

Military Operational Medicine

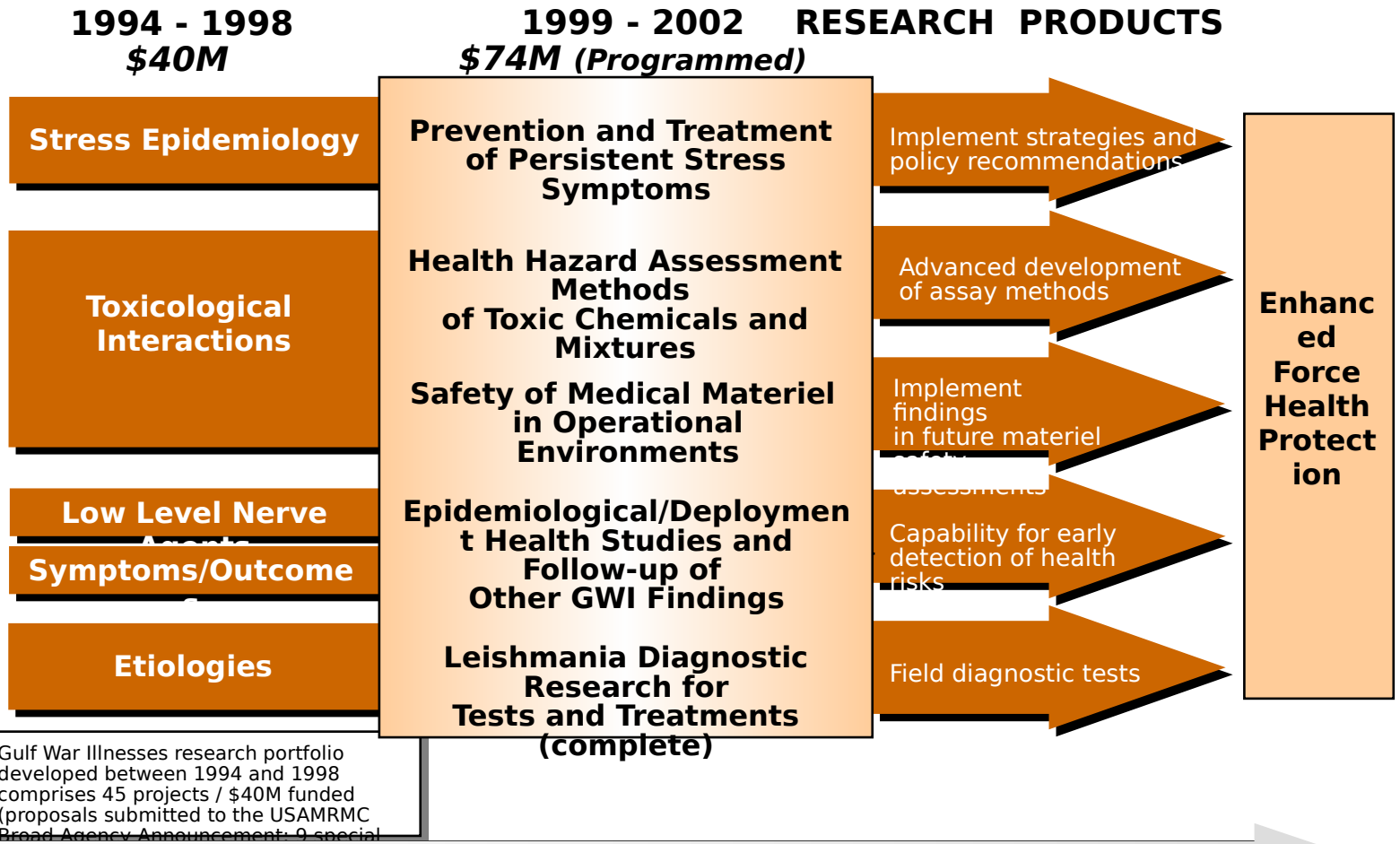


- **Investment: $61M S&T, $3M Adv Dev (‘04 PBR)**
- **Enhance performance for combat success.**
- **Produce large savings in care and lost duty time.**
- **Prevent catastrophic injury or failure.**
- **Save on development of materiel and doctrine.**
- **Understand consequences of stressors & threats.**
- **Includes Force Health Protection Research Program (follow-on to GWI Research Program).**

Force Health Protection Research Program

- **GWIRP was retitled FHPRP in 1999 at request of Assistant Secretary of Defense (Health Affairs) to reflect broader program scope:**
  - **Shift from retrospective to prospective research.**
  - **Greater emphasis on prevention.**
- **Builds on lessons learned from 1991 Gulf War; targets solutions to problems which may arise in future deployments.**
- **Stimulates forward-looking research to improve force medical protection.**
- **Links intramural and extramural researchers to bolster intramural science capabilities and to increase extramural institutional interest in military medical research problems.**
- **Program supported by tri-Service advisory panel; all research receives independent peer review.**
- **Funding: ~$10M/year.**

FHPRP Science Roadmap


1994 - 1998
$40M
1999 - 2002
$74M (Programmed)
RESEARCH PRODUCTS
Stress Epidemiology
Toxicological Interactions
Low Level Nerve Agents
Symptoms/Outcome
Etiologies
Prevention and Treatment of Persistent Stress Symptoms
Health Hazard Assessment Methods of Toxic Chemicals and Mixtures
Safety of Medical Materiel in Operational Environments
Epidemiological/Deployment Health Studies and Follow-up of Other GWI Findings
Leishmania Diagnostic Research for Tests and Treatments (complete)
Implement strategies and policy recommendations
Advanced development of assay methods
Implement findings in future materiel
Capability for early detection of health risks
Field diagnostic tests
Enhanced Force Health Protection
Gulf War Illnesses research portfolio developed between 1994 and 1998 comprises 45 projects / $40M funded (proposals submitted to the USAMRMC Broad Agency Announcement: 9 special
Retrospective research pre-FY00 / Prospective research FY0

FHPRP Mission Focus

OCCUPATIONAL EXPOSURES

- **Fuel vapors**
- **Combustion products (e.g., vehicles)**
- **Oil well fire smoke**
- **Altitude**
- **Sand**
- **Heat/cold**
- **Munitions fragments**

- **Traumatic events**
- **Anxiety**
- **Boredom**
- **Family separation**
- **Reunion**
- **Health behaviors**

Warfighters are rarely subjected to one stressor at a time yet little research pre-Gulf War had evaluated interactions relevant to military operational environments

FHPRP Current Investment Focus

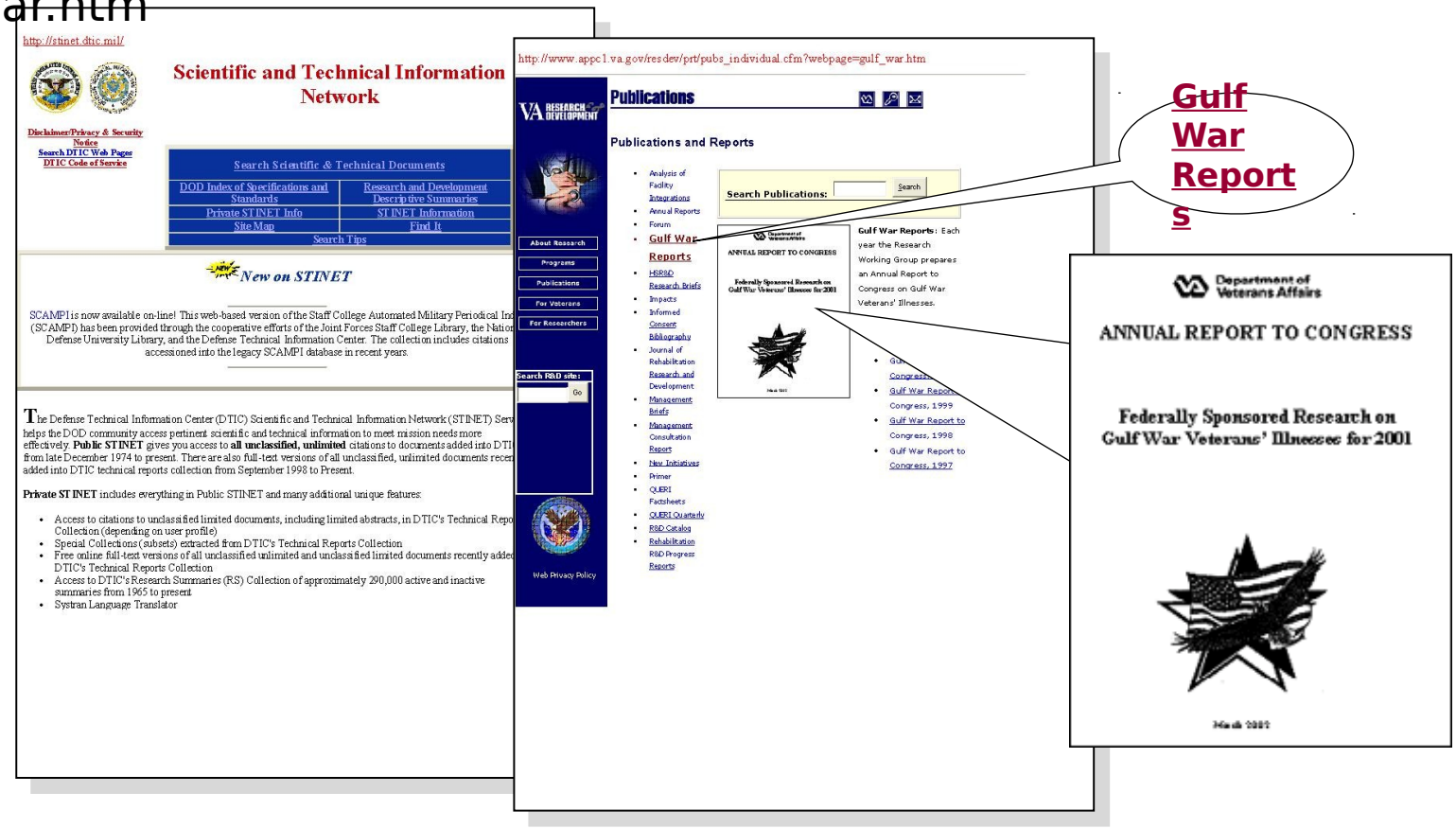
- Global Health Monitoring: methods to follow health status from recruitment through deployment and into VA system.
- Health Behavior Interventions: strategies to modify health risk factors (alcohol, tobacco, weight, STDs, unintended pregnancy) that affect military readiness.
- Health Risk Communication: assessment of various methods of providing health risk information.
- Health Risk Assessment: identification of environmental risks important to post-deployment health.
- Medical Materiel Safety: improved safety testing of medical materiel before use in environments where deployment stressors may produce unanticipated effects.

FHPRP Items of Potential Multi-agency Interest

- Millennium Cohort Study: Long-term, longitudinal collection of data on deployment health from 100,000 service members.
- Studies of neurobehavioral associations and Gulf War symptoms are discovering general mechanisms linking adversity and health outcomes.
- Center for Deployment Health will pioneer methods to monitor post-deployment health of specific military populations.
- Detailed data collection has been initiated for all casualties evacuated out of Afghanistan.
- Follow up will be conducted on patients with embedded depleted uranium.
- The Chem/Bio Defense Program continues to address low-level nerve agent exposure.

Gulf War Illnesses Research Information Sources

- http://stinet.dtic.mil
- http://appc1.va.gov/resdev/prt/pubs_individual.cfm/webpage=gulf_war.htm


http://stinet.dtic.mil/
Scientific and Technical Information Network
Search Scientific & Technical Documents
DOD Index of Specifications and Standards
Research and Development Descriptive Summaries
Private STINET Info
STINET Information
Site Map
Find It
Search Tips
New on STINET
http://www.appc1.va.gov/resdev/prt/pubs_individual.cfm?webpage=gulf_war.htm
Publications
Publications and Reports
Search Publications:
Gulf War Reports
Gulf War Reports: Each year the Research Working Group prepares an Annual Report to Congress on Gulf War Veterans' Illnesses.
ANNUAL REPORT TO CONGRESS
Federally Sponsored Research on Gulf War Veterans' Illnesses for 2001
Department of Veterans Affairs
ANNUAL REPORT TO CONGRESS
Federally Sponsored Research on Gulf War Veterans' Illnesses for 2001
March 2001

Gulf War Reports

FHPRP: Selected Accomplishments

- Developed and established DoD Birth Defects Registry for early identification of associations with occupational and deployment exposures.
- Developed diagnostic skin test for Leishmania infection (transitioned to advanced development).
- Discovered apparent absence of blood/brain barrier effect, which is being further evaluated in operational stress conditions.
- Classified some undiagnosed Gulf War veterans' illnesses with symptoms and physiological changes that overlap chronic multi-symptom illnesses (Chronic Fatigue Syndrome and Fibromyalgia).
- Discovered carcinogenic potential of large fragments of imbedded depleted uranium in laboratory animals.
- Discovered new brain stress mechanisms and specific new drug interventions that may be useful in adapting to stress during combat and for modification of adverse health consequences from high-stress conditions.
- Developed test method for squalene antibodies that is being applied to sera of deployed & non-deployed veterans to determine associations with symptoms of illness.
- Discovered potential adverse effects of the administration of multiple vaccines during high stress conditions.

Military Medical Technology Forecast

- Novel vaccines for debilitating and life-threatening infectious diseases.
- Individual protective equipment based on new understanding of human biomechanics.
- Mobile and flexible life support for long-range evacuation.
- Operational doctrine and ration supplements to improve and sustain operational capability.
- Strategies to protect against ionizing radiation.
- Prediction and prevention of performance degradation and injury.
- Diagnostic and treatment systems for forward medics.
- Novel products for self and buddy control of hemorrhage.
- Advanced treatments for laser eye injury.
- Methods to assess individual psychological stress limits.
- Exposure biomarkers that are sensitive, specific, and easy to use; that can determine personnel exposure; and that can predict health consequences.
- Biologically based health-risk-assessment methods.

Key to Abbreviations (1 of 2)

- AD: Advanced Development
- CCC: Combat Casualty Care
- CONOPS: Concept of Operations
- CONUS: Continental United States
- Coop DoD/VA Med Res: Cooperative DoD/VA Medical Research Program
- CW/BW: Chemical Warfare/Biological Warfare
- DHP: Defense Health Program
- DNBI: Disease Non-Battle Injury
- GWI: Gulf War Illnesses
- MOM: Military Operational Medicine
- PBR: President's Budget Request
- PDA: Personal Digital Assistant
- RDT&E: Research, Development, Test & Evaluation
- S&T: Science & Technology (basic & applied research)

Key to Abbreviations (2 of 2): Laboratories

- AFRIMS: Air Force Research Institute of Medicine
- AFRL: Air Force Research Laboratory
- AFRRI: Armed Forces Radiobiology Research Institute
- BAFB Det: Brookes Air Force Base Detachment
- NAMRL: Naval Aerospace Medicine Research Laboratory
- NAMRU: Naval Medical Research Unit
- NDRI: Naval Dental Research Institute
- NHRC Tox Det: Naval Health Research Center, Toxicology Detachment
- NMRC: Naval Medical Research Center
- NSMRL: Navy Submarine Medicine Research Laboratory
- USAARL: US Army Aeromedical Research Laboratory
- USADRD: US Army Dental Research Detachment
- USAISR: US Army Institute of Surgical Research
- USAMRICD: US Army Medical Research Institute of Chemical Defense
- USAMRIID: US Army Medical Research Institute of Infectious Diseases
- USAMRU: US Army Medical Research Unit
- USARIEM: US Army Research Institute of Environmental Medicine
- WRAIR: Walter Reed Army Institute of Research